GEOGRAPHIC

SCHOOL BULLETINS

THE NATIONAL GEOGRAPHIC SOCIETY, WASHINGTON 6, D. C.

MARCH 28, 1960, VOLUME 38, NUMBER 24 . . . *To Know This World, Its Life*

Stone Age Australians

also—

- Waterfalls of the World
- Sardines
- Migration to America

Aborigine warrior hurls "one-way boomerangs" of ironwood. Feather ball in mouth lends fierceness. Elbow thongs denote mourning.

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a nonprofit educational and scientific society established for the increase and diffusion of geographic knowledge.

F. D. MC CARTHY

GONE FISHING — Australian aborigines use a primitive net to catch a meal: perhaps mullet, silversides, groupers, butterfly fish, or varieties similar to herring or perch. The fisherman who wants a bigger catch takes a larger but similar contraption to deeper water.

This net works simply. It has two triangular arms about three feet long. The fisherman pushes it open into the water, then closes it on a cruising fish. The net is then lifted out to remove the captive. Sometimes a companion helps drive fish into the net.

Although the method sounds unlikely, a skillful man can catch as many as 80 fish, some a pound and a half in weight, in a few hours.

powerful, they often decorate them with sacred symbols.

Transplanted to a farm, the aborigine would not know what to do. He has no form of agriculture, not even the smallest garden. The wilderness is his larder. He has learned to use almost everything nature has provided. Where a white man would starve, the aborigine gets along nicely on a menu of white ants and their larvae, caterpillars, grubs that taste like roast pork, flying foxes, snakes, lizards that taste like chicken, rats, and mice. He sucks nectar from flowers and digs vegetables from the ground.

Both men and women spend most of their time searching for food. Men go after big game—buffalo, wallaby, dugong (sea cow), sea turtles, alligators, and fish. They gather turtle eggs to be roasted or boiled. Women dig yams, collect oysters, crabs, cockles, snails, water lily bulbs. They chop holes in hollow logs to capture bandicoot or possum, and dig for lizards.

The aborigine learns early to smear his body with clay or mud—to destroy sweat odor and to simulate the color of tree trunks—before he stalks a kangaroo. As soon as he is old enough to hoist a stick, he practices spear throwing.

The race is composed of medium-sized people, seldom very tall, very short, very fat, or very thin. Their skin color ranges from reddish-brown to dark chocolate. They have high cheek bones, wide flat noses, thick full lips, and dark brown eyes.

Their feet are broad, and a gap between the big and first toes allows them to pick up objects with their feet. A common trick in skirmishes during the

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CHARLES P. MOUNTFORD, ABOVE AND COVER

Aborigines Roam Australian Wilds

THE HUNTER RETURNS to camp, spear and spear thrower at his side, faithful dingo at his heels. The hunting was good today—there will be kangaroo for dinner, roasted in hot sand and campfire embers.

The fellow is an Australian aborigine. No one knows where his people came from or when they landed in Australia, but it is thought they may have traveled from somewhere in Asia between 10,000 and 20,000 years ago.

When the white man established his first settlement in 1788, some 300,000 aborigines roamed the continent. As civilization spread, hunting grounds disappeared, and the number of aborigines fell. Today there are some 74,000. About 46,000 are full-blooded. About 28,000 have mixed blood. Nearly all those with mixed blood and nearly half of the full-blooded aborigines live near white settlements. Only about one-third are still nomadic.

These tribes wander mostly over the rocky, arid wastes of the Northern Territory, a north corner of Western Australia, Northern Queensland, and coastal islands such as Melville Island and Groote Eylandt. Many live on government reserves where white settlement is excluded.

In 1948, Charles P. Mountford, Australian ethnologist, headed a National Geographic Society-Smithsonian Institution-Australian Government expedition to Arnhem Land, a reserve in north central Australia. In 1954 he led a Society expedition to Melville Island. He reported his studies of these groups to the world in *National Geographic* articles.

Study of the "abo" gives an idea of how our Stone Age ancestors lived. They have no metals. They fashion their spears, clubs, axes, boomerangs, chisels, nets, and traps of bone, wood, or stone. To make their weapons more

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trunks, sheets of bark, even his own skin with pictures of their deeds. He propitiates them with rituals that may last two weeks.

This is the way Australian aborigines used to live and the way some 23,000 of them still live. White civilization has enveloped others in varying degrees.

One native herds steers all day on a Northern Australia cattle ranch. At night, the eerie music of the *didgeridoo*—a woodwind instrument—pierces the darkness, and the figures of *corroboree* dancers gleam in the firelight; the cowhand by day serves the old gods by night.

He may disappear one day into the bush, to be gone a week or longer. He tells no one he is leaving. He offers few explanations on his return, only that he has been "walkabout."

Some aborigines become well-known in art, music, and sports. A Tasmanian textile firm orders designs from Arnhem Land aborigines. Although conditions differ in the various states of Australia, the general aim is the same: state help to the natives with housing, education, health services, and employment.

The Australian government intends that eventually these people will be assimilated into Australian life. It has established an annual National Aborigines' Day to draw attention to the aborigines, their culture, traditions, and current problems. L.B.

PHOTOGRAPHS BY JANE C. GOODALE

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early days of white settlement was for a native to appear unarmed by dragging his spear between his toes.

They are an agile and graceful people with a great capacity to endure hardship. Their intelligence has yet to be evaluated accurately. They show remarkable memories, sharp sight and hearing, and practical wisdom. But they seem to have little ability in abstract reasoning.

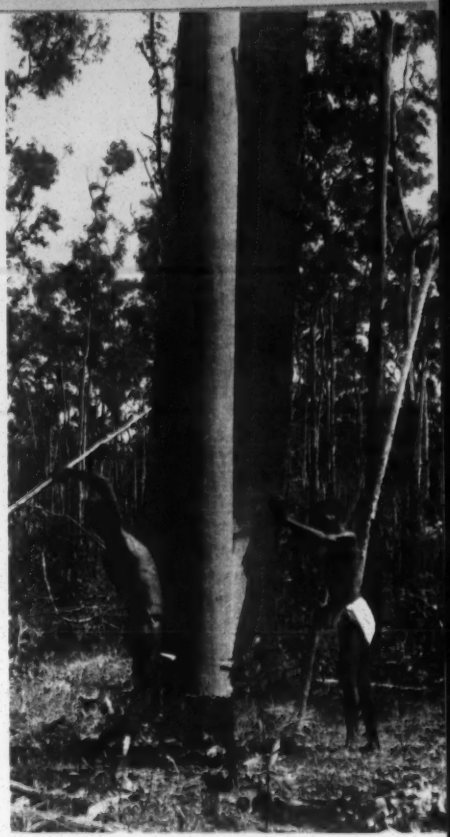
Aborigine families carry all their possessions on their backs as they wander with the seasons from one hunting ground to another. As long as a man has a spear and his wife has her grinding stone, digging stick, and dishes, the family is equipped for housekeeping.

There are no clothes to pack. Before the white man came, the aborigine wore none. Now he wears a *naga,* or simple loincloth. He even sleeps outdoors in his naga, snuggling close to his dog near a fire. He measures temperature in terms of the number of dogs he needs to keep warm. A cold night is a four-dog night. Frost on the ground means a six-dog night.

Not many aborigines are homeowners. Only a few crude lean-tos of saplings, bark, or mud spot the rocky and desolate land where the aborigine roams. Even in civilization, where houses are provided, he often prefers to live outside.

The aborigine believes that spirits created his world—not only the people and landscape, but customs, laws, religion, songs, and ceremonies. These spirits are his gods. He decorates cave walls, tree

AMERICAN AUSTRALASIAN BUREAU ABOVE, JOHN E. BRAY



ABORIGINE HANDICRAFT—Men above strip a long piece of bark from a eucalyptus tree. From it they will make a canoe. Youngsters at left play beside a bark hut.

For approaching ceremonies, Tamaluka of Melville Island decorates a bark basket (top picture below). He sews with a vine for thread, and sharpened wallaby bone for a needle.

A dead Tiwi tribesman is not properly buried without carved and painted ceremonial posts surrounding his grave. The axman (middle picture below) carves one from bloodwood. His metal tool is evidence of contact with white settlers.

The finished columns, gaily painted (bottom), look down on a grave as mourners dance in frenzy at climax of a funeral ceremony. The bark basket will be left on the grave.

RALPH GRAY, BELOW, J. BAYLOR ROBERTS, NATIONAL GEOGRAPHIC STAFF

"The splendour falls . . . and the wild cataract leaps in glory"

In Canada's Northwest Territories Alexandra Falls (above) drapes a curtain of water over a ledge 109 feet high. On Luzon in the Philippines (right) a dugout canoe penetrates 300-foot-deep Pagsanjan Gorge to the bottom of a funnel-like double falls.

The world's tens of thousands of waterfalls take all shapes and sizes. Venezuela's Angel Falls is highest (3,212 feet). Iguazú drops 237 feet; Vernal, 317. On the basis of mean annual flow plus considerable height, Guaíra Falls, upstream from Iguazú on the Paraná, is the world's greatest waterfall. Its volume is 470,000 cusecs (cubic feet per second), compared with Niagara's 212,200, Iguazú's 61,660, and Victoria's 38,430. Niagara has the steadiest flow and the longest unbroken crests—2,500 feet on the Canadian side and 1,000 feet on the American. R.G.

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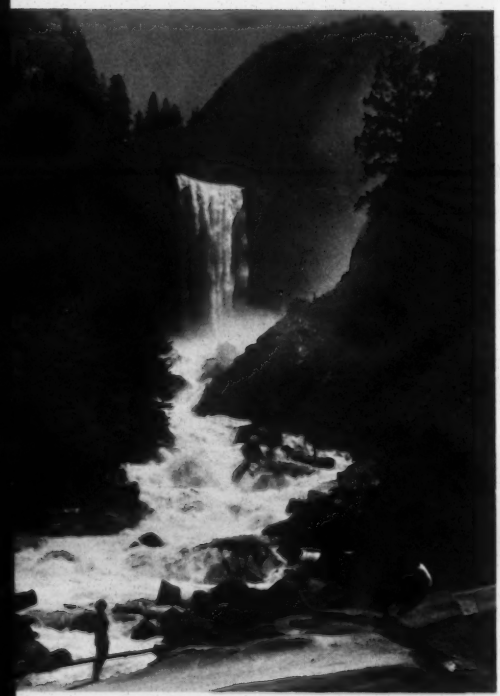
JEAN AND FRANC SHOR, NATIONAL GEOGRAPHIC STAFF

Waterfalls of the World



ANSEL ADAMS

FEW SPECTACLES of nature surpass the waterfall — be it a torrent thundering through the Argentina - Brazil jungle (Iguazú, above), a plummeting cliff leaper in Yosemite National Park (Vernal, left), or a lacy trout stream in New York, below.

B. ANTHONY STEWART, NGS STAFF

The Maine sardine is an Atlantic herring *(Clupea harengus)*. It is strictly a sea fish. Unlike its relatives, the shad and alewife, it does not enter fresh water.

At birth, the fish measures about a quarter-inch. It grows rapidly and may reach sardine size—three to five inches—at the end of a year. Should it escape the hungry jaws of animals and other fish that feed on it (cod, halibut, squid, whale) and the fishermen's nets, the adult will measure 18 inches.

It ranges the European coast from the Strait of Gibraltar to Scandinavia. Sardine fishing and canning are important industries in Portugal, Norway, France, and Spain.

Sardines course the coast of North America from Cape Hatteras to Labrador and Greenland, with incredibly large schools swimming north of Cape Cod.

Maine waters supply about five-sixths of the 3,000,000 cases of sardines (100 cans per case) packed in the United States every year. Here the sardine industry is the mainstay of 10,000 people.

Sardine factories stand on points jutting into the sea. Men catch the fish and women work in the canneries, their nimble fingers arranging the sardines in tin containers. Employment in a sardine factory is much like membership in a volunteer fire department. When a cargo of fish arrives, it must be packed without delay, and workers are summoned at any hour of the day or night.

Most years the sardines appear in large schools up and down the coast. Other years the crop is so small that the industry comes to a standstill.

Many old-time Down-Easters still catch sardines Indian style. They use weirs, pronounced "wares" in Maine. They stretch brush, poles, and nets across coves and inlets to trap the creatures swimming close to shore. The schools swim through the maze of brush until they are hopelessly trapped in the center of the weir.

Most sardines, however, fall prey to more modern methods. Instead of waiting for the fish to swim shoreward, seiners go out after them, seldom more than three miles off the coast.

Spotters in seaplanes and boats, some with sonar equipment, sight a school of fish whose silver scales gleam in the moonlight. The fishermen let down their nets, capturing sardines by the thousands of pounds. By radio they notify the cannery on shore of the size of the catch, and often close the sale while still at sea.

While the fishermen hold their nets, the canner dispatches carrier boats to haul in the catch. Many of these cargo vessels give the fish the rubber hose treatment. A special fish-handling hose sucks the sardines from the net to the boat's hold, doing away with the slow, backbreaking hand-loading seen at left.

Aboard the cargo ship, the scales are removed and the sardines salted. For the poor fish, it is only a few hours from sea to can. L.B.

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PHOTOGRAPHS BY LUIS MARDEN, NATIONAL GEOGRAPHIC STAFF

SARDINES . . . Familiar Food Fish Nourishes Industry

THE MAINE DAWN silhouettes fishermen against the fog as they work their boats and scoops within a huge net. Their catch is Atlantic herring, better known as sardines, versatile food fish now doubling in industry.

Women find sardine products in jewelry stores and beauty salons. Planes make emergency belly landings on cushions of sardine foam.

A coating washed from the silvery scales, called pearl essence, turns glass beads into artificial gems. String them, and you have a "sardine" necklace that, to the untrained eye, rivals the beauty of a string of pearls.

Iridescent fingernail polish is made from guanine, a waste product found in the sardine's air bladder. Industry makes a rust inhibitor from sardines.

In the more familiar guise of food, sardines are a biologically complete protein, easily digested, and helpful in building muscles. Manufacturers now turn sardines into a high protein flour —without fishy flavor. They are a natural base for cat food.

The fatty acids in canned sardines lower the amount of cholesterol in the blood and help fight heart disease.

Sardine is not the real name of this industry-hopping little fish. It is only a nickname given to several species of small fish that have soft bones, a rich flavor, and can be preserved in oil. It was christened because these fishes were at one time plentiful around the Mediterranean island of Sardinia. Their numbers in this area have since decreased.

The California sardine is really a pilchard—a member of the herring and shad family that swims the Pacific in large schools from the Queen Charlotte Islands off British Columbia to the Gulf of California. Almost the whole catch of three States—Washington, Oregon, and California—is reduced to oil or dried and sacked as meal to be used in chicken feed and fertilizer.

Scotland and Hungary, Russia and Germany, Denmark and Japan. Wherever they came from, a common bond tied them together: they looked with high hope for a new life, if not for themselves, at least for their children.

Centuries of poverty sent us Poles. Potato famines chased hungry Irishmen to our northeastern cities. Anti-Semitism in Germany scattered Jews throughout the country. Victims of depression at home, Danish farmers found their way to Wisconsin and Illinois.

Before the day of the luxury liner, they clambered down a ladder from the deck of a merchant ship to the hold, just above the baggage. They were ballast for cotton, tobacco, and timber ships returning to America.

They hung their hams, herrings, cheeses, and onions on nails, spread their berths with fresh straw, and settled down to sway with the waves of the ocean as the little ship made its two-month voyage to the New World.

Robust countrymen unaccustomed to long days and nights of inactivity, they struggled to turn Italian or Romanian into English, debated the injustices of the homeland they were leaving, or silently speculated on the problems that would face them in the unfamiliar country. Clear days brought them to the decks from the murky, cramped steerage.

There were saints and sinners. Clergymen bunked next to card sharps. Schoolmasters joined the illiterate. Shoemakers, farmers, and tailors made the crossing.

Many remained in the ports where they landed, taking the lowest jobs in the shipyards and factories and pushing older Americans up a rung on the economic and social ladders. Others fanned out across the country, adding Old World strength and skill to that of native America. They dug canals and laid railroads, hewed farms from woodlands, quarried rocks, mined coal.

They wrote letters home from farm, labor camp, or the company house near the mine. Other members of the family followed. The farmer who answered a knock at his door might find on his stoop a former school friend and his family. Settlements of immigrants attracted newcomers, grew, subdivided, and pushed westward.

CITIZENS-TO-BE—New York City immigrants learn pledge to flag before naturalization

INTERNATIONAL NEWS PHOTOS

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Immigration Peopled A Growing Land

AT LAST! A wisp of a smile, hopeful yet unsure, lights the face of the modern-day immigrant as he and his son stare from the ship toward their new homeland. The no-longer-young faces of the women below are marred by confusion as they wait for baggage tags.

What lies in the future for them, America's newest citizens-to-be? Judging from the past, a new life of hope and a strengthening of the country they came to.

Every time an Atlas missile screams into space, it is a tribute to the men who made it possible: Teller, Shriever, Von Braun, and Pickering—a Hungarian, two Germans, and a New Zealander.

Is the young man strolling his village for the last time before sailing to America a Carnegie or a Pulitzer, a Rachmaninoff or a Frankfurter, a Riis or a Noguchi?

They all came—more than 39,000,000 of them between 1820 and 1950—from

ERNST HAAS, MAGNUM, ABOVE, NATIONAL GEOGRAPHIC PHOTOGRAPHER ROBERT F. SISSON

NATIONAL GEOGRAPHIC PHOTOGRAPHER VOLKMAR WENTZEL

OLD WORLD ORIGINS of New Glarus, Wisconsin, revive each year in a Swiss pageant

The thirteen colonies, of course, had been settled by immigrants, and their countrymen who continued to arrive during the early years made the New World grow and prosper. But the century between 1815 and 1914 saw the high tide of the immigration wave.

It took shape in Ireland and the Rhine Valley, spread through central England, Scandinavia, and northern Germany, pushed through the Baltic states, Poland, Austria, and Italy, and finally found its way into the Balkans and the East. Chinese and Japanese crossed the Pacific. Mexicans passed over the Rio Grande.

In 1815 the time was ripe for Europeans to leave their lands and for Americans to receive them. Pioneers were pushing the frontier westward, and the country grasped at immigrant labor to replace the men who had set out toward the Pacific.

To Europe, 1815 brought peace after decades of war. But Napoleon's defeat also brought problems. It spread hard times as war industry shut down. Soldiers who had marched through country after country had seen new sights and grown restless.

The flood rose; each new foreign crisis washed another wave of humanity to our shores.

World War I put a stop to all immigration, and when the flow began again in the 1920's, legislation controlled it. The quota system was introduced, basing the number of new immigrants allowed from a country on the number of persons of that nationality living in the United States in 1920. Immigration is now a skeleton of its former self.

But for one glorious century it flourished, and America is the stronger for it. If these Finns and Czechs, Austrians and Turks, Greeks and Belgians brought empty pocketbooks, they brought their strength and skill to help build America when the New World needed them. Their habits and beliefs, their intellectual and artistic traditions enrich the texture of American thought and culture.

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